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## DEFENSE WOMEN'S HEALTH RESEARCH PROGRAM

03 June 1996

Final Report

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## **INTRODUCTION**

### **RELEVANCE TO SERVICEWOMEN / MILITARY**

The systematic study of women's health issues in the military is timely for women in all branches of service. Numbering approximately 10% of active duty service members, women are increasingly assuming critical positions of responsibility which fully expose them to the hazards of combat. Following the collapse of the Berlin Wall, the resulting global instability has required the military to prepare its forces, including women, to engage in planning for a number of mission contingencies. These missions include peacekeeping (e.g., Sinai MFO treaty; Bosnia), peacemaking (e.g. Haiti), humanitarian aid (e.g., post-ODS civilian refugee care; Somalia), disaster response to natural and manmade disasters (e.g., Hurricane Andrew & Los Angeles riots), and, of course, combat, in the air, on land and at sea.

At present, military women are confronted by both direct and indirect (secondary to support roles) combat exposure. Military leaders have long recognized that mission readiness requires both the absence of disease and the presence of mental, physical, and spiritual health. However, little is currently known about how the health of military women may be uniquely affected by extreme environments. Such knowledge is essential to meet the health needs of military women and to sustain fitness for all mission contingencies.

Servicepeople are naturally concerned with maintaining their health as an integral part of their readiness to assume any mission they are trained to perform. Research aimed at identifying and understanding overall and gender-specific stressors involved with combat stress, trauma, and extreme environments will enhance the ability of individual servicewomen to care for themselves within an institution that is informed of and concerned with their needs. Educational and preventive measures resulting in servicewomen assuming informed responsibility for their health needs within the context of a supportive group system parallels the process of fostering individual initiative and group cohesion that is essential to mission performance on aircraft, ships, and battlefields.

Gender differences can at times be real, but also of no practical use or importance. Gender differences in health and stress response may confer advantages or disadvantages depending on the context. Present research on stress and gender indicate that women are more likely than men to be depressed and describe phobias and panic attacks (Baum & Grunberg, 1991). It has often been assumed that women experience less stress at work than men, although data are scant on this issue. Women are more likely to visit physicians and seek health care; many of the reported differences in rates of illness may result from this factor.

Gender may mediate the effects of stress on health in several ways. Firstly, directly through biological differences. Secondly, by affecting perception, interpretation and attribution of the external event. Some data indicate that women are more willing to report distress than men, although illness and physiologic responses may not differ from males. Thirdly, women generally report greater social supports than men. Social supports (e.g. unit cohesion) are well known to affect health, either directly or by improving coping. Fourthly, women may use different coping behaviors or use the same coping behaviors at different rates. Smoking and alcohol use are examples of coping strategies that have traditionally been used more frequently by men. As increasing numbers of women adopt similar coping strategies, the effects of stress on health may also change in women.

Studies on the effects of exposure to a number of traumatic events illustrate the complexity of understanding the potential effects of combat stress on women. Data indicate greater risk for posttraumatic stress disorder in single parents with children than in married parents with children, and higher rates of somatization among women in general. Higher rates of substance abuse and violence in men and the higher base rates of depression, greater social supports and higher reported distress after exposure to death and the grotesque in women, may lead to different responses to trauma across genders. In addition, differences across the menstrual cycle in fatigue, chronic stress tolerance, and effects of sleep deprivation may increase or decrease stress tolerance and health effects.

This multi-study programmatic project was focused on understanding the effects of the stress of combat, trauma and extreme environments on women's health and performance. Through this project we have identified critical health and performance issues related to women in the extreme environments of combat, peace-keeping, peace-making, humanitarian operations, and deployment. The project consisted of four parts which addressed the effects of these stressors in operational environments.

## BODY

**Part I:** *Computerized Database on Women's Health and the Stress of Combat, Trauma and Extreme Environments:* A computerized literature database on the effects of extreme environments, combat, stress and trauma on women's psychological health and performance was developed. It broadly examined the biopsychosocial stressors and responses in women by collecting English language non-classified epidemiological and stress research in these areas and by examining analogous areas in which relevant conclusions can be drawn (studies of disaster events, confined environments, Antarctica, space, etc.) The database also includes references and abstracts of articles on stress and women's health, traumatic stress, occupational risk factors, deployment, disaster medicine, humanitarian aid, ethical considerations, and sexual harassment. All articles were screened for relevance and scientific quality. The database is on CD-ROM and is accessible by personal computer using software that is readily available (PROCITE) and the standard of the field. A *User's Guide* as well as PROCITE software are included in the deliverables.

**Part II:** *Empirical Studies:* The results of the empirical studies are enclosed in the volume, *Stress, Health & Performance in Military Women: Prospects, Pitfalls & Protean Patterns from Current Research*. This part of the project empirically examines trauma and women's health in existing datasets collected by our research group. We analyzed several of our existing datasets of military women exposed to traumatic events, e.g., Operation Desert Storm, Hurricane Andrew, three airplane disasters, and epidemiologic data of women in the military. We also examined our existing data on the spouses of active duty men involved in these traumas. Our data sets include extensive assessments of physical and mental health, posttraumatic distress and psychosocial functioning. Analyses describe each group of women and in several of the studies compare them with a matched group of men and, in some studies, women with similar exposure or with no exposure. Particular attention is given to rates of possible PTSD symptoms, levels of somatization, depression, hostility, fatigue and health care utilization. These studies include:

1. Women deployed on the USS Comfort during Operation Desert Storm (N = 200, 35% women). Data during deployment and follow-up data were examined.
2. Homestead Air Force Base personnel after Hurricane Andrew (N = 243, 10% active duty women; spouses of active duty men, N=145) and matched control groups from MacDill and Shaw AFB (N=150, 10% active duty women; and spouses of active duty men, N = 90).



3. Sioux City, Iowa, United Airlines plane crash. We examined our data on the disaster workers (185th Air National Guard Fighter Group) and their spouses. We have data from a matched control group at the Air National Guard Unit in Sioux Falls, South Dakota. The groups were matched by mission and sociodemographics of the communities. The total sample size was : N = 308 (Sioux City) and 421 (Sioux Falls). Approximately 10-15% of each of these groups are women. In addition, a sample of women indirectly exposed to the trauma of the crash (spouses of the ANG groups) was available (N= 196 for Sioux City; N= 255 for Sioux Falls). Thus we examined both high direct exposure to the air crash and indirect trauma exposure in the spouses using matched control groups.
4. The 1988 Italian Air Show crash at Ramstein AFB. We have data from people involved at the Ramstein Medical Clinic (N = 126). We also have data from personnel at nearby Landstuhl Medical Center who treated victims of the disaster (N = 234). Approximately 35% of each of these groups are active duty service women.
5. Active duty enlisted army troops from Fort Ord and Fort Carson (N = 2223 with 403 women) addressing garrison stressors and mental and physical health. We focused our analysis on two epidemiologic studies, e.g., the General Health Questionnaire (GHQ), and the General Well-Being measure as well as measures of unit and personal morale.

**Part III. Expert Panel:** Distinguished military, academic, and civilian experts were convened to review identified areas of stress effects on women's health from the database and empirical data analyses. Military experts from the United States Armed Forces as well as from overseas were invited. The extensive range of professional expertise and relevant scientific data provided the basis for developing mission-specific recommendations for tri-service distribution. The edited transcripts of this conference appears in the volume, *Gender, Stress, & Coping in the U.S. Military, Volume I, Trauma, Stress & Health: Military Women in Combat, Deployment & Contingency Operations*.

*Seminar Series:* A series of seminars were held to collect more information on stress and women's health. Transcriptions of these seminars were edited into a series of volumes which are enclosed (*Gender Stress, and Coping in the U.S. Military - Volume II: Historical Perspective on Acculturation, Deployment, and Contingency Stresses; Volume III: Performance; Volume IV: Training, Deployment and Contingency Stressors.*)

**Part IV: Summary of Critical Areas by Area Experts:** A volume containing solicited contributions by experts in the field was compiled entitled, *Sex Differences, Stress, and Military Readiness*. This volume expands upon issues which are especially important to understanding the health effects of extreme environments on women.

## CONCLUSIONS

The consensus among scientists involved in the project is that there remains a good deal to be learned about the health effects of the stressors of military service on men and women. As we enter the Twenty-First Century, the changing nature of military missions and shifts in the demographics of military members suggest the importance of maximizing the benefits offered by increased diversity in the Armed Forces. Different missions such as peacekeeping with its ambiguous environments provide arenas where skills and temperaments, perhaps different than those for war-fighting, are adaptive. Training must focus on maximizing individual and unit performance across a wide variety of scenarios and should be informed by research. Future research strategies should focus on sex as one variable affecting health and performance, rather than focusing studies on "women" which serve to reinforce a minority status.

The vast scope of the project makes it impossible to adequately summarize conclusions in a condensed form. The following deliverables (attached as appendices) represent a compendium of information and conclusions:

1.     *Gender, Stress & Coping in the U.S. Military*  
          Volume I: Trauma, Stress, and Health: Military Women in Combat,  
                    Deployment, & Contingency Operations
2.     *Gender, Stress & Coping in the U.S. Military*  
          Volume II: Historical Perspectives on Acculturation, Deployment &  
                    Contingency Stresses
3.     *Gender, Stress & Coping in the U.S. Military*  
          Volume III: Performance
4.     *Gender, Stress & Coping in the U.S. Military*  
          Volume IV: Training, Deployment, and Contingency Stressors
5.     *Sex Differences, Stress, and Military Readiness*
6.     *Stress and Women's Health Computerized Database User's Manual*  
          (with CD-ROM containing the database and PROCITE<sup>®</sup> software)
7.     *Stress, Health & Performance in Military Women:*  
          *Prospects, Pitfalls & Protean Patterns from Current Research*
8.     *Recommendations*

Finally, we have distilled findings from all facets of the project into a volume entitled, *Recommendations*. These recommendations address the accumulated knowledge of extreme stress on women's health and performance and resulting operational needs of command; training; medical care; and research. We reprise the priority conclusions and associated recommendations here:

1. Studies on the stress of homecoming following war trauma are greatly needed. Homecoming stress may differ by gender and requires further study to identify gender related stress responses and coping strategies since they are related to health care utilization as well as morbidity and mortality. Examining recovery from PTSD in several available civilian models (motor vehicle accidents, traumatic injury and in family violence) will provide information relevant to homecoming and recovery from war trauma.

2. Studies seeking to explore gender effects should not be conceived of or labeled as "women's studies" in the military. Rather, research should focus on military units which include men and women. Gender should be considered as one variable and studies of performance and health should be encouraged to address this variable in their design.

3. Although women report greater stress in response to many events, it is unclear how this reporting relates to long-term outcomes relative to performance, morbidity and disability. Specific measures of performance, morbidity, and disability should be included in such studies. Research should study end points which are militarily relevant; e.g., research regarding days lost as well as medical symptoms reported.

4. It is important to study attribution processes (e.g., how "cause" is assigned). Attribution processes have become highly important to understanding "ODS Syndrome" where medical problems are attributed to ODS service although no data support this belief. In addition, attribution can result in stigmatizing certain populations such as higher ranks or ethnic groups or genders. Gender differences in attribution may well be present. Medical care and planning after homecoming will benefit greatly from better understanding in this area.

5. Studies examining gender and traumatic/combat stress should pay particular attention to self-selection, individual past history, training experiences, and past exposures to traumatic events as potential confounds of any findings attributed to gender.

6. A Joint Military Medical Readiness Center with fellowship opportunities should be established in which medical personnel (male and female) can meet across services and across disciplines to receive readiness training and professional military education periodically during a career. (Similar to Command & General Staff/War College but with shorter course periods, e.g., 1-6 months.) This will increase knowledge of cross service gender differences and decrease gender-related combat differences which may appear in joint operations. An institution such as the Uniformed Services University can well serve this purpose and both maintain lessons learned and incorporate new changes rapidly for the education and training of future medical leaders.

7. Joint conferences/seminars of scientists and commanders and the development of a Clinical Scientist Training Program which include operational and scientific experience are needed. Military scientists must be able to understand and respond to the needs of the line consumers of research. It is also important to assist people in policy and administrative positions to apply the available data; to understand the research methods used; to know what works and what does not; and to identify the relative strengths and weaknesses of various studies.

8. The Department of Defense should develop a twin registry of female twins serving in the US military. This would be similar to the twin registry of male Viet Nam era twins. In 1995, there were 194,000 women serving in the Armed Forces. In the United States, 1 in 83 deliveries is a twin birth. One might, therefore, expect over 2,000 women in the Armed Forces are members of a twin pair. Such a registry would significantly enhance research on women and stress.

9. The impact of new missions on deployable units should be studied. Past research performed on units which have deployed en bloc may not generalize to current deployments in which parts of a unit or 1-2 individuals from a unit deploy. Examinations of the issues associated with the particular stressors involved in deploying ones and twos are needed. Gender integrated units may experience deployment stressors differently when deployment of parts of a unit cause different work distribution on remaining members. This research should also examine the role of leadership which becomes the only common denominator in deploying in ones and twos.

10. Mixed gender crew studies should be carried out for both short and long-term missions. Study of cognitive function, in particular, has rarely been examined in mixed gender crews. Such studies will aid in understanding multi-person crew function and may be much more relevant than other biological variables to actual crew performance.

11. Studies of single parents should be initiated. Single soldiers with children (the larger number of whom are male, but a higher percentage of whom are female) are an understudied group which may be more vulnerable to combat stressors due to less adequate social supports and instrumental assistance.

12. Studies of the effects of mother absence (in single parent and dual parent families) on children are greatly needed. The effects of father absence on children has been studied. However, comparable research studying the effects of mother absence is lacking. Studies in civilian populations are unlikely to be comparable because the demographics of military women (highly educated, employed) are very different from civilian counterparts. This gap in our knowledge base must be remedied.

13. Study of physical health problems reported following traumatic exposure is needed. Increased physical health problems are associated with the diagnosis of PTSD in women and men. Little is known about these physical health problems e.g., to what extent they are related to injury vs. somatization.

14. The relationship of substance abuse and deployment to family violence in the military requires examination in order to better understand episodes of family violence in the military community. The study of spousal violence in dual active duty and female on active duty families is needed to clarify the higher rates seen in these groups.

15. Studies of substance abuse in active duty men and women indicate that substance use among military women is associated with factors other than stress while substance abuse among military men is highly associated with stress. Identification of the different mechanisms fostering substance abuse in active duty men and women can aid in the development of prevention programs and education efforts targeted by gender.

16. Because of high rates of deployment and joint international operations, medical care providers must be taught the various ways in which stress symptoms manifest themselves in different cultures, genders and organizational contexts. Additionally, health care providers need education on the recovery from stress symptoms over time (e.g., differences in intrusion and arousal symptoms), how one might recover from some symptoms and not the others, and how these symptoms might be reflected differently in various sub-populations, including genders.

17. It is important to examine the relationship of past experience and training, previous traumatic event exposure and exposure to combat on post-combat PTSD, combat stress reaction, depression and substance abuse. There are data that experience (e.g. past combat) can both inoculate individuals and sensitize them. At present, the data support both views: that past experience helps prevent breakdown and that it potentially increases breakdown. In view of the military's missions, it is imperative that the different impacts of exposure be clarified and any gender effects identified.

18. The changed nature of the "front line" in battle has serious ramifications for medical readiness planning. As the tempo of operations has increased throughout the various echelons of care, readiness training includes what goes on at the homefront. ODS showed that when the tempo of operations has increased to a high pace, stress casualties can occur at medical centers in the rear as well as the front. Research designed to identify and monitor care providers' stress at the various echelons is needed. Such research should guide readiness training in the broad view of the combat field that now extends from frontline to home bases/posts in this era of expanded missions.

19. A new generation of military medical consultants, scientists, and researchers must be developed. This education and training should be accomplished across health care specialties. The Fellowship in Military Psychiatry at the Uniformed Services University of the Health Sciences should serve as a model for training military specialists to serve in research, education and as consultants to the Surgeons General.

20. Studies of gender examine what works, e.g., what are the factors that predict women's successful integration into a unit in which their introduction enhances the performance of the unit, or what is it about the command climate in which sexual harassment is not found versus those in which it is. Research must examine factors which promote resiliency as well as those which induce vulnerability.

## Comprehensive Reference List

See *Stress and Women's Health Computerized Database User's Manual*  
(with CD-ROM containing the database and PROCITE<sup>®</sup> software)

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## **APPENDICES**